

Combustion

Reagent	O ₂
Complete equation	Alkane + O ₂ → CO ₂ + H ₂ O
Incomplete equation	Alkane + 2O ₂ → CO + 2H ₂ O

Synthesis

Hydrogenation of alkenes and cycloalkenes

Reagent	H ₂ gas
Conditions	heat / 200°C pressure 50atm
Catalyst	Ni / Pt / Pd
Equation	Alkene + H ₂ → Alkane

Cracking (pyrolysis)

Large alkanes become smaller alkanes and alkenes

Condition	500°C
Catalyst	Zeolite (SiO ₂ - Al ₂ O ₃)
Equation	C ₆ H ₁₄ → C ₂ H ₄ + C ₃ H ₆ + CH ₄

Halogenation

Reagent	Cl ₂ / Br ₂
Condition	UV light / sunlight
Mechanism	Free radical substitution
Rules	Carbon 3° > 2° > 1° > CH ₄

Equations

Initiation (<i>homolysis</i>)	Br ₂ → 2Br•
Propagation (<i>radical + molecule</i>)	Br• + CH ₄ → CH ₃ • + HBr
	CH ₃ • + Br ₂ → CH ₃ Br + Br•
Termination (<i>radical + radical</i>)	Br• + Br• → Br ₂
	Br• + CH ₃ • → CH ₃ Br
	CH ₃ • + CH ₃ • → C ₂ H ₆

Halogenation

